

May 6, 2005

Dr. Colien Hefferan
Administrator
US Department of Agriculture
Cooperative State Research Education and Extension Service
1400 Independence Avenue, SW
Washington, DC 20250

Dear Dr. Hefferan,

Attached please find the New Jersey Annual Report of Accomplishments and Results (FY2004). Our report reflects the integrated research/extension/teaching structure, budget and programmatic efforts of Cook College, New Jersey Agricultural Experiment Station and Rutgers Cooperative Research & Extension.

Sincerely,

Keith Cooper
Acting Executive Dean

Karyn Malinowski
Director of Extension

Keith Cooper
Dean of Research

Certification Of New Jersey Annual Report of Accomplishments and Results (FY 2004)

Approval:

Keith Cooper
Acting Executive Dean

Karyn Malinowski
Director of Extension

Keith Cooper
Dean of Research

Date: April 2005

New Jersey Annual Report of Accomplishments and Results (FY 2004)

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Introduction:

New Jersey has been actively involved in the implementation of the integrated research/extension 5-Year Plan of Work for fiscal years 2000-2004 and the supplemental update for FY 2005-2006. The implementation of this plan has engaged New Jersey Agricultural Experiment Station researchers and Rutgers Cooperative Research & Extension specialists, agents and staff in the generation and transfer of knowledge and technologies related to agriculture, food systems, the environment and human and community development. The diversity of our state presents research and extension with complex challenges, which are being effectively addressed through basic, applied, and policy-oriented research, education and outreach.

We have engaged the residents of the state in a Visioning and Planning process which has resulted in a strategic plan for Cook College and the New Jersey Agricultural Experiment Station which is providing a framework for the future direction and focus of the College and the Station. Programmatic focus areas are agricultural viability, environment and natural resource management, food, nutrition and health, and human and community development. Our goal is to be recognized nationally as the “Solutions State” where quality of life is heightened by thriving agricultural, environmental, rural and urban communities. Stakeholders have played a pivotal role in the process and will continue to be viewed as partners in the planning and program development process for issues identification including those of the underserved and underrepresented.

Integrated research and extension programs as well as multi-state, multi-institutional and multi-disciplinary research and extension activities have addressed identified critical issues resulting in significant economic, environmental and social impacts which have proved beneficial to the state while at the same time achieving the goal of improved program efficiencies and effectiveness within Rutgers Cooperative Research & Extension (RCR&E).

A. Planned Programs

Goal 1

Overview: Operating within the most densely populated and urban state in the nation, New Jersey's agricultural producers face challenges unparalleled to their competitors in other regions of the U. S. These challenges include high land prices, property taxes, and labor costs, stringent environmental regulations, severe wildlife damage, and urban neighbors who desire rural, rustic settings but do not appreciate the complexity of agricultural practices. However, proximity to the large consumer markets, sophisticated food manufacturing and delivery systems and center of the pharmaceutical industry also provides unique opportunities for our producers. In light of these challenges and opportunities, we have focused our resources to increase the profitability of New Jersey's agricultural producers by:

- Adding value to existing crops or products through enhancements or identification of new market opportunities
- Protecting crops from pests and disease
- Increasing production efficiency and reducing costs

New Jersey Agricultural Experiment Station (NJAES) created Food Industry Research and Extension (FIRE) to provide solutions to the challenge of remaining viable in the future. Through educational seminars and its Food Business Incubator, this center provides farmers with an opportunity to create new businesses based on value added agricultural products, developing new products and commercial opportunities. It is anticipated that well over 250 companies will benefit from this Center by its fifth year in operation, and over 1,000 new jobs will be created in the region by its eighth year of operation. Services offered by the Center are expected to translate into considerable economic development in the region. It is estimated that the return on public investment will be at least \$5 for every \$1 invested. The Center has been renamed The Food Innovation Center (FIC) and has introduced a new program called the "Food Entrepreneurs Network" that provides educational forums and builds connections for start up companies. 46 percent of the centers clients have benefited from one-on-one consultations and 67% have been involved in the Center's outreach programs.

New Jersey has \$3.2 billion horse-related industry. The Equine Science Center was created to serve as the docking station for equine research and provides educational and outreach services to the equine industry and horse owners. The center's mission of "Better Horse Care through Research and Education" is implemented through an integrated research and extension focus. Researchers are working on improving the health of animals through studies on West Nile Virus, preventing pregnancy losses, and reducing drug use in racing horses. Intensive research and a public information campaign aimed at horse owners resulted in a reduction of reported cases of West Nile Virus from 152 in FY 2003 to only 6 in FY 2004.

The mare reproduction discovery made at the Center has the potential of saving tens of millions of dollars to the breeding industry. The potential economic benefit in New Jersey alone is \$5.6 million. In addition, research and extension staff at the Center wrote a manual to help municipalities create guidelines for horse farm management

The cost of doing farming in New Jersey is high, for many reasons. Threats to productivity, such as invasive pests and disease are of particular concern for the state's farm community. When a new

threat appears, such as a new disease, farmers rely on the coordination of NJAES and other regulatory organizations, such as the Department of Environmental Protection and industry to come up with products or management techniques to reduce the impact of that threat. Within 36 hours tomato growers had legal access to a new fungicide as a result of the rapid response from a Rutgers Cooperative Research & Extension faculty to this critical issue.

Goal 1

Allocated Resources:

Research

Hatch Funds:	\$1,549K
All Funds:	\$16,618K
SY's:	33

Extension

Smith-Lever Funds:	\$605K
All Funds:	\$5,936K
FTE's:	88

Goal 1

Key Themes: Agricultural Competitiveness
 Agricultural Profitability

Activity: The Food Innovation Center (FIC) provides research, education, outreach and business development services to New Jersey's agricultural and food industries. The Center is driven by the underlying need to improve the outlet for agricultural products and move New Jersey agriculture into a new age of "value added." Considering the high cost of doing business, New Jersey farmers cannot grow the same commodities as farmers in the Mid-West and still remain competitive. The proximity of New Jersey agriculture to the largest consumer market in the nation suggests that farmers can capture some of the values beyond the farm gate by producing high value prepared foods to be sold at specialty food stores, farm stands, supermarkets, and restaurants. The acceleration of value added activities will enhance the viability of agriculture and can turn the tide of declining profitability in agriculture. In recognition of the economic, fiscal, quality of life, ecological, environmental and social benefits of agriculture, New Jersey has committed billions of dollars to the preservation of farmland and open space. Without preserving the viability of farms, the return of these expenditures to our residents will be compromised.

The Center is located in Bridgeton, Cumberland County, and in the hub of New Jersey's food processing and agricultural products industry. Bridgeton and the surrounding area are in a Federal Empowerment Zone and a New Jersey Urban Empowerment Zone. Cumberland County has the highest unemployment rate 8.6% and the lowest per capita income in the state (\$17,376, versus the NJ average of \$27,006, and the US average of \$21,587). The Center is a catalyst for creating new jobs in the region, and is the first service-based, food and agricultural industry incubator model to exist in the United States. It has already become a template for similar programs throughout the United States.

The Food Innovation Center (FIC) provides critically needed expertise to New Jersey's \$63-billion agricultural and food industries; which comprise one of the state's largest industries. The center has developed strategic partnerships with the City of Bridgeton, Cumberland Empowerment Zone, New Jersey Department of Agriculture, New Jersey Commerce, USDA Agricultural Research Service, USDA Rural Development, and numerous state and federal food and agricultural associations. It provides a direct link for business development and technology transfer from the vast resources of Rutgers to clients located throughout the state.

Started in January 2001, its team of on-site specialists and strategic partners offer a full array of services to farmers, agricultural cooperatives, food business entrepreneurs and established food companies. The Center provides innovative research, customized practical solutions, resources for business incubation, and a trusted source for information and guidance. The Center provides innovative solutions to a variety of constituents, including farmers desiring to create businesses based on value-added agricultural products, startup companies evaluating differentiated concepts in the area of nutraceuticals and other high-growth sectors, and existing companies seeking to commercialize new technologies. With its team of on-site specialists and its linkage to vast resources at Rutgers University and strategic partners throughout the state and nation, the Center provides its client companies a full array of services that include business development, market development, product and process development, workforce development and training, regulations and manufacturing support, and quality assurance and food safety programs.

Impact: During the past year, the Food Innovation Center has provided assistance to 223 clients throughout the state, providing economic development for the entire region. Farmers constitute more than half of the clients, and an additional 36% are startup businesses. For all clients, 46% have received one-on-one consultations, and 67% have been involved in the Center's outreach programs. The Center has also introduced the Food Entrepreneurs Network that provides educational forums and builds connections for startup companies. Finally, it is proactively developing value-added products from underutilized, culled agricultural raw materials and providing these concepts to farmers within the region.

Sources of Federal Funds: USDA Competitive Funds

Scope of Impact: State Specific

Goal 1

Key Themes: Agricultural Profitability
Animal Health

Activity: Horses, once an essential of American farm life, are now treated as an option for sport and entertainment. But in a state like New Jersey, the fifth smallest and most densely populated in the U.S., horse-related farming is one of the few remaining economically viable agricultural pursuits. It preserves open space and offers profitability to farmers. What's true in New Jersey is also fact for other rapidly urbanizing locales. So keeping horses and the horse industry healthy should be everyone's concern. The Rutgers University Equine Science Center at the New Jersey Agricultural Experiment Station has combined the expertise of RCRE specialists and research faculty in land use; water, pasture and waste management; endocrinology; equine nutrition; parasitology; exercise physiology; turfgrass; entomology and many other disciplines to provide solutions to horse farmers, horse owners, traditional agricultural farmers with horse-related operations and the overall horse industry in New Jersey to ensure the viability of the industry and the vitality and well-being of the animal. The center's mission of "Better Horse Care through Research and Education" is implemented by an integrated research and extension focus which primarily provides solutions to problems facing the industry.

Impact: Highlights of the work of Rutgers Cooperative Research & Extension specialists and research faculty and its economic impact include:

Mare Reproduction – Using the naturally occurring hormone relaxin, our scientists have discovered a procedure for identifying equine pregnancies at risk and monitoring treatment for at-risk pregnancies. Based on a USDA estimate that approximately 9.0 percent of fetal/neonatal foal deaths are due to problems during pregnancy, application of this technology could result in savings of tens of millions of dollars to the breeding industry, \$5.6 million in potential economic benefit in New Jersey alone.

West Nile Virus – In 2003, there were 152 reported cases of West Nile Virus (WNV) occurring in horses in New Jersey. Of these, 47 animals died or were euthanized, for an estimated loss of nearly \$1 million in animals and an imputed negative economic impact of nearly \$17 million. RCRE launched that year an intensive research and public information campaign aimed at horse owners that advocated vaccination, good barn management practices to eliminate mosquito populations, and attention to bird populations identified as virus carriers. The results were only six cases of equine WNV reported (with five deaths) in 2004.

Policy Assistance – As the most urbanized state in the U.S., New Jersey often struggles to create a balance between agricultural impact and needs and the desires of the populace. Equine is the third largest commodity (after landscape products and vegetables) in the state and the largest animal segment. It accounts for 81,000 acres of farmland, an increasing percentage of which is being preserved forever. RCRE and the Equine Science Center drafted the document "Agricultural Management Practices for Commercial Horse Farms" which serve as guidelines to help municipalities create policy governing equine operations. The 11,000-word document would have cost the state an estimated \$160,000 had it been developed by private consultants.

Partnering with Regulators – Data emerging from the Equine Exercise Physiology Laboratory and analysis of methods used to detect performance-altering substances administered to racehorses was key to the success of a test case argued before the New Jersey Supreme Court. The case supported one of the key testing programs in New Jersey, and it will have impact across the country. In New

Jersey alone, more than 50 pending cases have been settled without going to trial, saving taxpayers an estimated \$1.25 million in litigation costs

Sources of Federal Funds: Hatch, NJAES

Scope of Impact: State Specific

Goal 1

Key Theme: Agricultural Profitability Plant Health

Activity: Phytophthora (Plant Destroyer) is a very destructive plant pathogen in New Jersey, throughout the nation and the world. It is a genus of plant pathogens that cause destructive blights of ornamentals, trees, vegetables and fruits. Species of Phytophthora have had significant impacts on human civilization. The Irish Potato Famine, Jarrah Forest Dieback, Sudden Oak Decline, and Cacao Pod Rot are all examples of major epidemics caused by this group of plant pathogens.

Recently, fungicide resistant strains of one Phytophthora species have been found in the state. The result is uncontrollable outbreaks of this disease. RCR&E faculty are working to record specific locations of fungicide resistance within the state, and find new control measures including blight-resistant varieties, biological control agents, and new fungicides. Recently, a farmer appealed to the nearby Rutgers Agricultural Research and Extension Center for assistance with a potentially devastating outbreak of late blight infection in tomatoes.

Impact: Finding an effective solution required the quick action and cooperation of RCR&E, the New Jersey Department of Agriculture, the New Jersey Department of Environmental Protection, the Pennsylvania Department of Agriculture, New Jersey state legislators, and DuPont, a fungicide manufacturer. Thirty-six hours later, tomato growers had legal access to a new fungicide they desperately needed to help manage this disease.

Sources of Federal Funds: Hatch

Scope of Impact: State Specific

Goal 1

Key Theme: Agricultural Profitability Home Lawn and Gardening

Activity: Despite our best efforts, Rutgers Cooperative Research & Extension is still the best kept secret for the general public. Many farmers, landscapers, Master Gardeners, and professional horticulturalist depend on the expertise of Cooperative Extension for information and leadership. Many Cooperative Extension staff provide outstanding educational programs and consistently demonstrate a high level of effective teaching and communication skills. In order to provide accurate research based information on horticulture, agriculture, nutrition and environmental issues, our team developed an educational television series for NJN Public Television. The television program showcases the expertise and programs of Cooperative Extension personnel. The television series also promotes New Jersey agriculture and showcases the expertise of New Jersey farmers. The program demonstrates how the latest University research from the Agricultural Experiment Station helps to solve real world problems.

To date, 21, 30-minute television episodes were created for the “If Plants Could Talk” television series, Eighteen episodes have aired on NJN PBS to a potential audience of 8 million viewers. Filming for four episodes for the 2005 series was done in 2004. The television series aired for 8 months in 2004 on NJN once per month following the popular program “This Old House” The television series has been airing on NJN PBS since 2000. The program is designed and produced by Cooperative Extension faculty and staff. The target audience is the general public and according to Nielsen ratings appeals to a wider audience range than other popular gardening shows such as Victory Garden.

Impact: Each airing of the IPCT program attracts between 50,000 to over 150,000 viewers throughout the state of New Jersey as well as parts of PA, CT, DE and NY. NJN PBS airs the program once per month from April to December during Saturday afternoon and occasional evening slots on Saturdays and Sundays. As a result of the program close to 9 million people have come to the “If Plants Could Talk” web site for more information on gardening, extension programs, environmental issues, and NJ agriculture. Over 50,000 people have reviewed or downloaded list of “Pick-Your – Own” farms as well as many thousands of fact sheets and other information. Two nurseries reported selling out of plant material recommended on an IPCT episode, immediately after the airing of the program. Feedback from over 250 people filling out the online survey on the IPCT website indicate a high level of satisfaction with the television program and the web site. Over 90% of surveys indicate that the television series is good or better than any other gardening program that they have seen and that they will incorporate practices such as IPM and proper plant selection and care in their own landscapes. In addition, internet users report that the IPCT web site contains valuable information, is easy to navigate and that they would recommend the site to others. Letters and emails from many individuals document that people are watching and adopting environmentally sound horticultural practices in their landscapes.

This high level of web traffic after the airing of the television series, combined with positive Nielsen ratings, emails and letters from the public indicate that the IPCT television series has been a successful outreach tool for Cooperative Extension. Many more people are now aware of Extension programs because of the television series.

Source of Federal Funds: Smith-Lever 3(b) & (c)

Scope of Impact: State Specific

Goal 2

Overview: New Jersey has one of the most culturally diverse populations in the United States. At the same time, a significant proportion of our residents live at or below the poverty line and do not attain even the most basic daily nutritional requirements. New Jersey farmers also have attempted to capture increased value by moving into small scale processing. Added to these are a large number of small food processors attempting to meet the needs of local consumer markets. In addition, 70 percent of the nation's major food manufacturing firms have headquarters or research facilities within a hundred mile radius of The Rutgers University campus. Due to recent events, biosecurity is of increasing importance to agriculture. In total, there is a great need to design and deliver innovative programs that address both the diverse food security, safety, and quality needs of consumers, and, at the same time, the food safety and handling and technological needs of the agricultural and food system within the State.

Cook College and the New Jersey Agricultural Experiment Station mobilized a response and provided information within 48 hours to a Mad Cow disease incident. The Food Policy Institute consumer survey results following detection of a positive case of BSE in the United States revealed that consumer confidence in the beef supply had not changed. Rapid transmitted of research based information to consumers and producers utilizing media and electronic technology were effective in reducing public misconceptions about the safety of the food supply.

Fruit and vegetable buyers have concerns about microbial contamination which could threaten the market. Children are very vulnerable to E. coli infection and researchers have focused their attention on identifying a new antimicrobial and it's effectiveness against E. coli in popular kid's foods such as apple cider. RCR&E specialists and agents have developed educational programs and strategic collaborations to address this threat to the fresh produce chain.

NJAES delivers a multi-faceted food security program targeted to underserved and underrepresented audiences to meet the diverse needs of N. J. consumers. This program includes activities to link N. J. growers with school lunch and summer feeding programs, youth farmstands which bring fresh produce to urban areas while at the same time providing workplace skills to urban youth, and the production of produce in community based gardens and greenhouse operations.

NJAES is prepared for any threat to biosecurity. We are poised to provide agricultural information, such as farm locations and crop status; emergency measures to insure survival of plants and animals; emergency management and information dissemination.

Goal 2

Allocated Resources:

Research

Hatch Funds:	\$521K
All Funds:	\$2,675K
SY's:	3

Extension

Smith-Lever Funds:	\$55K
All Funds:	\$911K
FTE's:	14

Goal 2

Key Themes: **Food Safety** **Foodborne Pathogen Protection**

Activity: While news of the discovery of potentially infected cattle immediately evaporated the \$3 billion U.S. beef export market, Americans are relatively unperturbed. Most said their confidence in the beef supply has not changed, and some said the USDA's prompt and efficient treatment of the case has actually led to an increase in confidence. However, government agencies and the beef industry did not know the impact on consumer confidence in the US beef supply.

In this mad cow disease incident, Cook College & NJAES mobilized a response and provided information quickly, within 48 hours. The Food Policy Institute conducted comprehensive poll provided immediate, necessary information that has been used by local and national government agencies, industry organizations and farmers. Public misconceptions about the disease were communicated as well. RCRE Agricultural Agents immediately transmitted the latest information throughout the state, addressing questions from consumers and producers. They also spoke with media outlets to convey objective, research-based information. Cook College & NJAES created web sites to serve as information sources for industry and consumers seeking reliable information about the diseases.

Impact: The Food Policy Institute immediately implemented a large consumer survey after the detection of a positive case of BSE in the US. Nearly 68 percent of those who had heard of the case said their confidence in the beef supply remains unchanged and 8 percent said their confidence has actually increased. One in five Americans (22 percent) said their confidence has decreased, albeit not by much. Only 7 percent said their confidence has decreased 'a great deal', while 15 percent said it has fallen 'some' or 'a little'. Consumer confidence seems to have been buoyed by the belief that farmers and the government are taking appropriate measures to control mad cow disease.

While confirming the drop in stated consumption patterns found in other recent polls, the Rutgers study suggests this reduction is likely temporary for most. Only about 1 percent of Americans say they have given up beef for good. Nearly 40 percent of those who have stopped eating beef said they will resume eating it within six months, assuming no other cases of mad cow are found, while a little more than a quarter said it will take more than six months.

About two thirds of those interviewed believe that someone in the U.S. will eventually eat beef infected with mad cow disease, but few are particularly worried that the disease poses a direct threat to the health of themselves or their families. Only about 5 percent of those who normally eat beef say they were 'extremely' or 'very' worried that someone in their family will contract mad cow disease.

The Food Policy Institute poll also found that many Americans have misconceptions about the nature and consequences of mad cow disease. While, three-quarters of those interviewed understand that the human equivalent of mad cow disease (vCJD) is fatal, only about half understand that it cannot be treated using antibiotics. Moreover, only 56 percent of those interviewed realize that cooking beef thoroughly will not reduce the chance of getting sick from eating beef contaminated with mad cow disease.

Source of Federal Funds: NJAES

Scope of Impact: State Specific

Goal 2

Key Theme: Foodborne Illness

Activity: Food born illness is a critical issue nation-wide costing billions of dollars in lost productivity, hospitalization and in many cases resulting in death. Food contamination, caused by pathogens in various raw or cooked foods, affects millions of people annually. Children are particularly vulnerable food borne illness such as those caused by the pathogen E. coli. This project will examine the effectiveness of a new antimicrobial substance, found in fish, against food-borne pathogens in apple cider.

Apple cider was chosen as the test food material for pleurocidin because there is wide-spread concern regarding the survival of E. coli 0157:H7 in apple cider. E. coli 0157:H7 has been shown to survive for over 21 days in apple cider stored at refrigeration temperature. It was discovered that pleurocidin was active against E. coli 0157:H7 isolated from rotting apples, it is tolerant to low pH (pH4) and is heat resistant even at high temperatures. Pleurocidin is ideal as a preservative for apple cider which is acidic in nature and in addition to being susceptible to E. coli 0157:H7, might be also infected by yeasts and molds, both of which have been shown to be sensitive to pleurocidin.

Impact: The work done on the shelf-life studies in apple cider using pleurocidin highlights its usefulness as an antimicrobial. Its effectiveness in apple cider is very significant for improving the safety of the food supply for children, since the majority of apple cider consumers are young children, and every year several children die or are seriously injured by drinking E. coli contaminated apple cider.

Sources of Federal Funds: Hatch

Scope of Impact: National

Goal 2

Key Theme: Food Accessibility and Affordability

Activity: Small scale, family-labor farms have declined substantially in number in recent times, and to some extent they have been replaced by industrial-like operations. Agricultural production has also become regionalized as areas exploit their comparative advantage. The relationships between large scale, regionally concentrated producers, national and multinational food processors and distributors, and the structure of local food systems are complex, geographically complicated, and heavily influenced by policy. Yet they are poorly understood. This multistate project (NE-185) provides critical information about farmers, food and agricultural firms, families, communities and consumers in different locales and with different resources respond to and manage these dynamic changes. The project has developed and refined protocols for studying food systems of individual counties or regions within our participating states. The methodologies employ both quantitative and qualitative tools for gathering information about trends in the production, processing, distribution, access, and policy dynamics of the food system. Work is progressing on the selection of common "food system indicators" so that all participating states might gather the same data so that it can be compared and contrasted. Studies are also analyzing attitudes and relationships among a variety of food system stakeholders.

Impact: Research parameters were developed to measure the impact of community initiatives to create more localized food systems because these initiatives often include social and environmental risks as well as benefits and such strategies. NJAES researchers also collaborated with a number of community-based programs to begin moving this analytical framework into practice. This included collaborating with the New Brunswick Community Health and Environmental Coalition (CHEC) to promote improved understanding and relationships between community stakeholders on issues of sustainable urban food systems; collaborating with the Rutgers Urban Ecology Program's Farm-to-School Initiative to conduct research, education, and professional development for and with stakeholders; collaborating with the Rutgers Urban Ecology Program's Youth Farmstand Project to educate at-risk youth in 7 locations in New Jersey in the entrepreneurial skills necessary to run a farmstand that sells New Jersey Fresh produce; and collaborating with the Rutgers Urban Ecology Program's School Yard Ecology Program to: a) introduce sustainable food, agriculture, and diet lessons to teachers and students of primary and secondary classrooms in 8 schools in New Jersey; b) train 15 nutrition education student interns in teaching this program; c) test the educational value of the lessons, revise them, and develop a workbook entitled the School Yard Ecology Program that was posted in full on the web in 2001. A statewide mapping project to GIS map several sectors of the food system throughout the state was developed.

Sources of Federal Funds: Hatch

Scope of Impact: Multistate Research (ME, NJ, NY-C, PA, WV, CA, IA, KS, LA, MI, MO, NC, PR, TX, WA, WI, Wallace Institute for Alternative Agriculture)

Goal 3

Overview: New Jersey's culturally and economically diverse population includes those residents that can barely afford the most basic nutritional requirements and those who are willing and able to pay for high value health-promoting foods and dietary supplements. Across this entire spectrum, consumers are confused and concerned about nutrition-related information available through the media. New Jersey's agricultural and food system must serve these diverse needs. In response, NJAES has mounted a major multi-disciplinary *Food, Nutrition and Health Initiative*. Research and Extension faculty from our Food Science, Nutritional Sciences, Plant Sciences, Family and Community Health Sciences, Agricultural, Food and Resource Economics Departments, in cooperation with other units within Rutgers and other institutions within the region, are working on this initiative.

Obesity has become a national epidemic. This trend has a negative effect on disease and life expectancy for many New Jersey residents including our children. The NJAES funded the New Jersey Obesity Group (NJOG), a collaborative program that coordinates obesity research and outreach with faculty from Cook/NJAES-Rutgers University departments and the University of Medicine & Dentistry of New Jersey to address the serious health issues related to obesity.

Extension educators in the Family and Community Health Sciences department have planned and conducted nutrition and health educational programs to address the obesity epidemic. Of note is the "Children's Health Summit – Fighting Back Against Childhood Obesity" which resulted in the formation of a Building Healthy Kids Coalition to address children's health issues in the region.

The West Nile virus has underscored the need for mosquito research and control. Researchers are analyzing the scope of the threat to human health. This program, originally designed to monitor mosquito vectors has expanded to new invasive mosquito-borne pathogen and collection surveillance data.

New Jersey's Expanded Food and Nutrition Education Program is making a difference for those families who participated; diets have improved and families are managing food resources more efficiently.

Scientists continue their work on health promoting properties of food. Researchers have focused their efforts on investigating nutraceutical products from herbs and foods in preventing disease, treating diseases such as cancer, and promoting health. Educational programs developed and implemented by Extension educators address consumer health concerns about issues such as obesity, osteoporosis and the safety and effectiveness herbs and health. Participants in Extension educational programs reported that they learned about the safety and effectiveness of herbal supplements, factors influencing the quality of herbal supplements, common uses and precautions that need to be taken. These programs have resulted in increased awareness and behavior changes which have impacted the health status of New Jerseyans.

Goal 3

Allocated Resources:

Research

Hatch Funds:	\$908K
All Funds:	\$4,945K
SY's:	8

Extension

Smith-Lever Funds:	\$66K
All Funds:	\$1,090K
FTE's:	19

Goal 3

Key Themes: Human Health

Activity: The threat of West Nile Virus has spread to most of the country, jeopardizing human health as well as the nation's equine industry. In New Jersey, mosquito populations directly impact the public health and welfare of the residents and visitors in addition to influencing the economy of the state. Diseases transmitted by mosquitoes in New Jersey include Eastern Equine Encephalitis (EEE) and West Nile Virus (WNV). EEE poses a serious economic threat to New Jersey's \$650 million annual equine industry revenue. The New Jersey Agricultural Experiment Station, in cooperation with the New Jersey Department of Health laboratories, has been studying EEE at five study sites for more than a decade. The researchers monitor the seasonal progression of virus activity in the bird feeding mosquito, *Culiseta melanura*. This research enables New Jersey to target the most important mammal-biting species that transmit EEE from birds to humans and horses. When WNV first appeared in the New York metropolitan area in 1999, researchers applied a similar approach to the method used to combat EEE.

Impact: Because science has been applied to mosquito control, human cases of WNV and EEE in New Jersey have been minimal and equine cases are much lower than other states that do not have a viable surveillance program in place. In addition to successfully guarding humans and horses against these two diseases, New Jersey's monitoring programs are successfully protecting humans from the health risks associated with the excess use of pesticides. Fewer pesticides are needed because County Mosquito Control Commissions are able to focus on the control of larval mosquitoes using source reduction and biorational mosquito control products. Decisions to spray pesticides to reduce adult mosquito populations are made on the basis of sound scientific research.

Federal Funding Sources: Hatch Act, State (New Jersey State Mosquito Control Commission; New Jersey Agricultural Experiment Station), and Center for Disease Control Funding for WNV

Scope of Impact: State

Goal 3

Key Themes: Human Health
Human Nutrition

Activity: Obesity has become a national epidemic. This trend has a negative effect on disease and life expectancy for many Americans, including our children. Associated costs related to health care and other issues related to obesity are out of control. Obesity can have serious consequences, including premature death, cardiovascular disease, diabetes, hypertension, osteoarthritis, and certain cancers. These nutrition related diseases cost New Jersey more than \$2.1 billion per year. At Rutgers, The State University of New Jersey, 23 percent of students are overweight or obese, compared to 14 percent of college students nationwide. The New Jersey Agricultural Experiment Station at Rutgers funded the New Jersey Obesity Group (NJOG), based in the Nutritional Sciences Department at Cook College. NJOG is a collaborative program that coordinates obesity research and outreach with faculty from the Cook College Departments of Nutritional Sciences, Food Science, Family and Consumer Sciences and Human Ecology; Rutgers' School of Pharmacy and Department of Psychology; and The University of Medicine and Dentistry of New Jersey.

Rutgers Cooperative Research & Extension's Family and Community Health Sciences (FCHS) faculty and staff have designed and implemented innovative educational interventions to assist adults, teens and youth to make lifestyle changes to reduce and/or prevent obesity. FCHS has targeted health professionals, school professionals, school food service workers, caregivers of young children and consumers with research based nutrition information, relating to meal planning, preparation and food safety and healthy lifestyles. A Children's Health Summit – Fighting Back Against Childhood Obesity" was held in Cape May County. This summit engaged nurses, educators, dietitians, social workers and other professionals in a dialogue and planning session to aggressively combat obesity in the region. In other areas of the state, FCHS faculty have taught classes on Fad Diets: What is the Truth? The ABC's of Fruit Juice for Young Children, and Carbohydrates: The Good, the Bad and the Ugly".

Impact: As a result of the Children's Health Summit, 86% of participants reported a better understanding of the causes, consequences and solutions surrounding the childhood obesity problem. A significant outcome of the summit was the formation of the Building Healthy Kids Coalition (BHKC) comprised of individuals who participated in the summit and pledged to address the children's health issues in the region. The BHKC developed and implemented a walking program, "Steppin' Out Cape May Count" to combat and prevent obesity in adults and children. Other outcomes of the summit include: 1) coordination of a family fitness night in one school district, 2) faculty and staff in one district pledging to no longer use food as a reward and a school reviewing its policy on the use of vending machines. The Children's Health Summit will be replicated in other regions of the state in 2005. Participants who attended the Fad Diets program reported that 87% will reduce calories using a balanced diet. 83% will add some form of fitness to their weekly routine and 89% requested additional information on fats and oils and healthy habits and eating. Parents who responded to a follow-up survey following the ABC's of Fruit Juice lesson reported that they reduced the number of servings of juice from 3 to 1 a day and purchased 100% juice products instead of fruit punches for their children.

Basic research into the mechanisms of lipid transport and the role of newly discovered fat cell proteins that regulate fat storage may provide promising leads for the development of new anti-obesity drugs;, and data about how calorie restriction and diabetes affects the rate of bone turnover in overweight

women is showing that premenopausal women (unlike postmenopausal women) do not lose bone mass due to moderate weight loss and that calcium supplementation is beneficial in both groups of women. In addition, new insights are helping scientists understand how early nutrition is related to later risk for obesity and diabetes, and may lead to new methods for treating children who have suffered undernutrition in early childhood. explorations into how diabetes affects sweet taste, food cravings and dietary compliance is improving the treatment for gestational diabetes, which creates greater risk for poor fetal outcome and for developing Type 2 diabetes later in life.

Sources of Federal Funds: Hatch, Smith Lever 3 (b) & (c)

Scope of Impact: State-Specific, National

Goal 3

Key Theme: Human Nutrition
Human Health

Activity: The dietary quality of limited-resource audiences is poor. As a result, their health and well-being is at stake, and undue stress is placed on the medical community to meet their needs. To that end, our program provides nutrition education to adults and youth throughout the community aimed at achieving the following desired outcomes: improved diets and nutritional welfare; increased knowledge of the essentials of human nutrition; increased ability to select and buy food that satisfies nutritional needs; improved practices in food production, preparation, storage, safety and sanitation; and, increased ability to manage food budgets and related resources such as food stamps.

In fiscal year 2004 the New Jersey Expanded Food & Nutrition and Education Program (EFNEP) delivered behaviorally focused, outcome-based nutrition education classes to 4,663 adults, 2,492 of whom attended 6 or more classes, and 7,787 youth. Racial breakdowns for adults and youth, respectively, were: 50% and 51% African American; 37% and 31% Hispanic; 10% and 30% Caucasian; 2% and 1% Asian or Pacific Islanders; and, 1% and 1% Native American Indian. For census purposes, 100% of New Jersey is categorized as urban. However, eighty-three percent of our educational efforts occurred in central cities of over 50,000; 0% occurred in suburbs of cities over 50,000 people; 15% occurred in towns and cities of 10,000 - 50,000 people, 2% occurred in towns under 10,000 and rural non-farm areas, and 0% occurred in farming areas.

Impact: From a survey administered to 1,943, 78% of the adults who completed the program by attending 6 or more classes, it is noted that: 85% of families who participate in EFNEP improved at least one nutrition practice. 80% improved at least one food resource management practice and 61% improved at least one food safety practice. In addition the following behavioral changes were reported:

- 40% more often planned meals in advance
- 37% more often compared prices when shopping
- 36% less often ran out of food at the end of the month
- 39% more often used a grocery list when shopping
- 41% more often thought about healthy food choices when deciding what to feed their families
- 38% more often prepared food without adding salt
- 50% more often used the "Nutrition Facts" on food labels to make healthy choices
- 34% reported that their children ate breakfast more often
- 33% more often followed the recommended practices of not allowing meat and dairy foods to sit out for more than two hours
- 47% more often followed the recommended practice of not thawing foods at room temperature
- 38% fewer families ran out of food by month's end
- 52% used nutrition facts on food packaging to make healthy food choices
- 45% are planning meals in advance
- 36% report that their children ate breakfast more often

EFNEP educational outreach is making a difference for those families who participated, their diets improved. National data indicates that each dollar invested in EFNEP leads to \$10.64 savings in future health care costs.

Source of Federal Funds: Smith Lever 3(d)

Scope of Impact: State Specific

Goal 4

Overview: As the most densely populated state in the U. S., New Jersey is experiencing environmental problems sooner and more severely than other states. We are challenged with land, water and air issues and attaining an efficient balance between production activities, the environment, and human health. New Jersey is a microcosm of both the challenges faced at the agricultural/environmental interface and the mutually beneficial solutions that are possible. As such, it has the potential to serve as a model of how to achieve greater harmony between agriculture and the environment. The NJAES and Rutgers recognized this potential very early in their history and thus created an environmental sciences department nearly 80 years ago. The College of Agriculture was also renamed the College of Agriculture and Environmental Sciences in 1965. As a result, we have very broad and extensive research and Extension programming in this general area.

Programs such as Integrated Pest Management (IPM) and Interregional Program-4 (IR-4) provide the bridge between the research and practical application to help farmers, the nursery industry other green industries stay viable in the state, while protecting the environment and communities from overexposure to pesticides. IPM practices have been adopted on 66,662 acres. Benefits have been seen in the areas of field crops, fruit, greenhouse, nursery and vegetable production systems.

The Asian Longhorned Beetle (ALB) caused millions of dollars in tree damage in the past seven years. The outstanding work of the Rutgers Cooperative Research & Extension County Agent resulted in the production of infomercials on the identification of ALB. He also provided training to the USDA APHIS inspectors which resulted in sightings and reporting which lead to savings of from \$10 - \$20 million dollars worth of susceptible trees.

Impaired waterways and safe drinking water are major issues facing New Jersey. Extension research and educational water resources programs are addressing water quantity and quality concerns. Eight existing municipal septic management programs were examined to enhance management. These best management practices will result in administrative efficiencies and tax dollar savings and reduce the number of impaired waterways. Initial cost savings to municipalities have been estimated to be 15% of the annual operating cost of the septic management program.

Goal 4

Resources Allocated:

Research

Hatch Funds:	\$881K
All Funds:	\$7,856K
SY's:	13

Extension

Smith-Lever Funds:	\$244K
All Funds:	\$2,926K
FTE's:	45

Goal 4

Key Themes: Integrated Pest Management

Activity: The state's nursery and greenhouse agricultural sector is significant economically, representing approximately 16 million square feet of greenhouse space producing crops worth \$121 million dollars annually. Pest control has become a economic and environmental issue for growers and the public alike and there is a demand for Rutgers Cooperative Research and Extension (RCR&E) resources in the areas of integrated crop management (ICM) and integrated pest management (IPM) for practices that minimize plant losses, pest infestations in landscapes, gardens, and environmental and health risks associated with misapplication of pesticides by consumers.

RCR&E faculty and staff have developed and implemented a comprehensive IPM/ICM program that has virtually eliminated organophosphorous and carbamate insecticide use in apple and peach study sites in 7 eastern states. In addition to the economic and environmental benefits, the overall fruit quality was similar for reduced-risk versus conventional pesticide application programs. Our reduced-risk IPM Program included mating disruption systems for Oriental fruit moth (peaches) and Oriental beetle (nursery crops, turf and blueberries) and the use of non-broadleaf ground covers to prevent damage caused by cat-facing insects (peaches). The vegetable IPM program which represents 27,500 acres was able to impact more acreage through the use of their website that tracks weekly European corn borer and corn earworm population changes in the state. This program has been so successful that it has been linked to a similar network maintained for Mid-Atlantic State by Pennsylvania State University. The Plant and Pest Advisory Newsletter and the Northeast Greenhouse IPM Notes were published and distributed to provide growers with timely IPM practices and critical information. Crop monitoring to detect pests was also implemented which resulted in improved pest management and pesticide application.

Impact: IPM practices have been adopted on 66,662 acres. Benefits were seen in the areas of field crops, fruit, greenhouse, nursery and vegetable production systems. In southern New Jersey, \$1,200 to \$4,050 in application costs was saved by field crop growers through reduction of pesticide use by 26 to 80% compared to standard calendar spray schedules. Pesticide use in tree fruit was reduced between 50 – 80 % for Oriental fruit moth control. Weekly pest management recommendations from Rutgers Cooperative Research & Extension led to pest free fruit valued at approximately \$32 million. Growers in the Vegetable IPM program received more timely information that resulted in less pesticide use (approximately \$50/acre savings). Nursery growers were better able to predict pest outbreaks and greenhouse growers were able to manage pests and reduce insecticide and fungicide use as a result of the scouting program. Overall impacts of the ICM/IPM program serve to decrease no point source pollution, decrease pesticide use, farm worker and consumer exposure to pesticides while at the same time maintain crop quality and yield.

Source of Federal Funds: Hatch Act, Smith-Lever 3 (b) & (c), NJAES

Scope of Impact: State Specific, Northeast Region

Goal 4

Key Themes: Integrated Pest Management

Activity: The Asian Longhorned Beetle (ALB) is an invasive insect pest that has caused millions of dollars in damage to trees in New Jersey, New York, Illinois and Canada in the past 7 years. In the past two years ALB has infested trees in Jersey City and Carteret New Jersey. Over 5,500 trees will be removed in NJ as a result of ALB damage or potential spread to susceptible trees within the quarantine zone. The unchecked spread of ALB would seriously threaten the forests, shade trees and forested residential areas in New Jersey, along with the lumber, maple syrup, nursery and tourism industries in the Northeastern United States. The most effective control for ALB in the United States is to cut and chip infested trees and replant with resistant trees. ALB can lead to major structural damage of adult trees leading to their decline and death. It is unclear as to the extent of infestation of this insect in our region. ALB was first spotted and reported by members of the general public with little entomological experience. The sightings were then confirmed by experts to be ALB infestations. Due to the destructive nature of this pest and the need for widespread vigilance to determine the spread of ALB, we put together an educational CD ROM on the Asian Longhorned Beetle that helps people to properly identify and report this invasive pest.

In the spring of 2004, less than two weeks after the first sighting of ALB in Carteret, our media production team created three infomercials from 30 to 60 seconds for New Jersey Network Public Broadcast Service (NJN PBS) on the identification and reporting of the Asian Longhorned Beetle. The infomercials were aired on NJN at peak times before or after lottery drawings and or news programs.

Impact: The ALB CD ROM was used to train 20 professional USDA APHIS contracted inspectors in Jersey City and Carteret / Woodbridge, NJ on proper detection of ALB damaged trees. The inspectors were then prepared to mark infested trees and establish quarantine areas. The training resulted in inspectors examining over 6,000 trees in the quarantine areas of Jersey City worth \$7,200,000. Only 114 of the 6,000 trees surveyed (1.9%) in Jersey City needed to be removed after detailed surveys were completed. This resulted in not removing 5,886 trees in the quarantine zone in Jersey City alone worth \$7,063,200. In Carteret and Woodbridge between 15,000 to 20,000 trees will be examined with an estimated value of over 24 million dollars. It is estimated that approximately 5,800 of the more than 20,000 trees inspected will need to be removed. The value of the trees saved is somewhere between 16 to 18 million dollars. This savings does not include the property value and energy savings from the trees saved. The CD ROM was distributed to colleagues in 15 states and in Canada.

Based on the USDA Forest Service review of the NJ ALB CD ROM, Hlubik was commissioned by the USDA to produce an ALB CD ROM for national distribution by 2006. As a result of the airing of the Asian Longhorned Beetle infomercials on NJN PBS, another person reported an infestation of ALB in a separate area of the county which expanded the quarantine zone. The quarantine zone has now expanded to 12.5 miles. The infomercials also stimulated other reports that fortunately turned out to be false. The reporting of the second infested location and immediate action to quarantine the area saved countless numbers of additional trees from being infected. Savings estimates on the short term basis probably range from 10 to 20 million dollars worth of susceptible trees.

Source of Federal Funds: USDA Forest Service, APHIS, Smith-Lever 3(b) & (c)

Scope of Impact: State-Specific, National

Goal 4

Key Theme: Pesticide Application

Activity: Almost 90% of crop sales in New Jersey are specialty crops. Agricultural Pest Control companies cannot afford to register pest control products on specialty minor crops. The USDA IR-4 program allows states to register new pesticide usage for naturally or introduced pests. Having crop protection tools available allows growers to economically produce crops and compete in world markets with their product. Through the efforts of the team at IR-4 Project Headquarters, housed at Rutgers University, New Jersey Agricultural Experiment Station, NJ, over one thousand new uses of lower risk crops protection chemicals/biopesticides were submitted by IR-4 to the US Environmental Protection Agency for food crops. Additionally, IR-4 data supported clearances of lower risk crop protection chemicals on non-food ornamental crops. IR-4 data also supported the establishment of EPA approved Emergency Exemption of Use in New Jersey to allow growers solutions to emerging pest management issues.

Impact: As a result of IR-4 submissions, US Environmental Protection Agency approved 1,014 new uses of lower risk crop protection chemicals/biopesticides for food crops. Additionally 215 clearances of lower risk crop protection chemicals on non-food ornamental crops were supported. These clearances allowed growers of specialty crops to protect their crops which are valued nationally at \$40 billion annually. Eleven EPA approved Emergency Exemptions of Use in New Jersey allowed growers solutions to emerging pest management issues. Of note is the weed control research conducted by Rutgers Extension Specialists that resulted in minor crop labels for the use of Stinger 3A and Sandea 75DF. Additional Rutgers turf research resulted in the identification of two experimental herbicides, Velocity and Certainty, which gained full registration from the EPA. Control of weeds on golf courses will lead to reduced fungicide and water use, improve the quality of cultivated sod, and the playing surfaces of athletic fields. It is estimated that the water use could be reduced by approximately 25% resulting in a reduction of 8 million gallons of water per golf course per year. Total water saved on an annual basis would be approximately 4.3 billion gallons of water per year. IR-4 estimates that emergency clearances have allowed New Jersey growers to avoid over \$30 million in crop loss over the past five years. Nationally, the loss avoidance is estimated at \$7,485 billion for the same period of time. Replacing ineffective controls with new controls will also result in a positive impact on the environment.

Source of Federal Funds: Smith-Lever 3(b) & (c), IR-4

Scope of Impact: State Specific

Goal 4

Key Themes: Water Quality

Activity: There are over 360,000 on-site wastewater treatment systems (i.e., septic systems) in New Jersey. These systems require regular management and maintenance to continue to function properly and minimize the impact to the environment. Many homeowners do not understand this need for management and maintenance of their septic system. Typically, these homeowners wait to deal with their septic systems only when a problem has occurred, thereby resulting in large repair or replacement costs that could have been avoided through regular management and maintenance. The U.S. Environmental Protection Agency (EPA) recognizes the importance of properly managing on-site wastewater treatment systems and has released management guidelines for these systems. This document defines five management strategies and discusses the advantages of each. It is clear that the EPA is eager for the States to use these guidelines to help them address the lack of management of these on-site systems. In New Jersey, only eight of the 566 municipalities have adopted on-site wastewater management ordinances/programs. By far, the Township of Montgomery in Somerset County, New Jersey has the most successful program in the State.

A program was developed to examine the eight existing municipal septic management programs to evaluate their success, to determine improvements that could be made to enhance these programs, and to develop educational materials to promote septic management to other municipal officials. Along with the North Jersey Resource Conservation and Development Council and NJDEP two educational sessions were held for Sussex, Warren, and Hunterdon Counties. Additionally, several fact sheets were produced on septic management. In working with Montgomery Township, Somerset County (one of the eight existing management programs) a septic management tracking program was developed that could be linked to the Township's GIS. Furthermore, assistance was provided to various stakeholders in the State to create a New Jersey Chapter of the National Onsite Wastewater Recycling Association (NJOWRA) where a presentation on these efforts was made at their first annual conference in September 2004. Work is continuing with Cornell, University of Puerto Rico, and University of Virgin Islands on developing septic system management tools that can be applied throughout EPA Region 2.

Impact: The septic tracking system that was developed for Montgomery Township is currently being used and saving the municipality money by simplifying the management of their operating permit program. Initial cost savings to the municipality have been estimated to be 15% of the annual operating cost of the septic management program (or approximately \$5,000/year in savings). As the program grows and expands, these cost savings will also increase. The system also allows the septic management program to be linked to the Township's geographic information system (GIS) so that environmentally sensitive areas within the Township can be targeted for advance septic system management. By allowing the Township to better identify potential problem areas in the municipality, corrective measures can be implemented to completely eliminate fecal coliform and nutrient pollution from failing or mismanaged septic systems.

Sources of Federal Funds: Hatch Act, Smith-Lever 3(b) & (c), CSREES (Regional Water Quality Project) and EPA

Scope of Impact: State

Goal 4

Key Themes: Water Quality

Activity: Non-point source pollution (NPS) is problematic for many New Jersey waterways. The Salem River (115 square mile) is the spine of the watershed, which has been cited by the Nationwide Rivers Inventory for “outstandingly remarkable values” in contrast the Musconetcong River and Pohatcong Creek have both been reported on the NJDEP 303(d) list of impaired waters to EPA for nutrients, fecal coliform and elevated stream temperatures. All three of these bodies of water are at risk for non-point pollution. In Salem County a broad-based educational campaign on protecting water resources, complimented with outreach to critical audiences included 1) visual scouting to reduce environmental impacts from field runoff using equipment such as global positioning satellites and mapping, 2) educating landowners and businesses to reduce coliform leaching from septic systems, 3) taking inventory of stream banks on participating farms/adjoining cluster homes for manmade sources of erosion and recommending vegetative buffers, reforestation, or other techniques to reduce pollution, 4) educating boaters, fishermen, and recreationists to watershed friendly practices that reduce NPS and protect habitat and species.

Riparian forest buffers have been established on four different sites in the Musconetcong and Pohatcong Watersheds to demonstrate the environmental benefits of buffers and buffer restoration to municipal officials, landowners, and the general public.

Impact: In Salem County the educational intervention has resulted in an excellent start to improving the health of the watershed. Educational resources such as a watershed newsletter and septic brochures were developed and distributed to 69% of all households.

Along the Musconetcong and Pohatcong watersheds, buffers were established to remove up to 70%, 60% and 90% of the non-point source sediments, phosphorous and nitrogen pollutants, respectively. Riparian buffers are an effective best management practice for reducing non-point source pollutant loading in rivers and streams.

Source of Federal Funds: Smith-Lever 3(b) & (c)

Scope of Impact: State-Specific

Goal 5

Overview: As noted previously, New Jersey has a culturally and economically diverse population. Demographic and socioeconomic factors such as poverty, indebtedness, changing employment conditions, and family structure create uncertain futures for individuals, families, communities, agricultural and food producers, and small business owners. Human and community development issues are the focus of many of our family and consumer sciences and youth development programs which address problems associated with urbanization and economic development. To improve the quality of life and enhance economic opportunity educational program have been planned and implemented resulting in the development of leadership skills, workforce preparation, basic life and financial management skills.

New Jersey has nurtured its most valuable resource through the 4-H Youth Development Program. Providing youth with opportunities to develop knowledge, attitudes and skills which are needed to become competent, caring and contributing members of society. Volunteers who are the backbone of this program have contributed an investment in time and efforts which translate to over \$11 million dollars in return.

“SJTC YOUnited”: Youth/Adult Partnership (South Jersey 4-H Teen Conference) engage youth and adults as equal partners in program planning and implementation. As a result individual counties have revamped their adult leader associations. Research results have shown that youth involvement and positive activities and on-going relationships with caring adults help youth become capable and successful adults.

Youth workforce development projects such as Youth Farm Stands, First Jobs in the Green Industry and Roots of Knowledge have resulted in workforce readiness skills and gainful employment for some of the youth involved.

Goal 5

Allocated Resources:

Research

Hatch Funds:	\$166K
All Funds:	\$1,748K
SY's:	4

Extension

Smith-Lever Funds:	\$250K
All Funds:	\$2,340K
FTE's:	43

Goal 5

Key Theme: Youth Development/4-H
Children, Youth and Families at Risk

Activity: The youth of New Jersey are our most valuable resource. They are challenged in today's environment with making choices and withstanding peer pressure to deviate from the mass. Our future depends on providing opportunities for youth to develop knowledge attitudes and skills which they need to become competent, caring and contributing members of society. The 4-H Youth Development Program uses experimental learning methods to engage youth grades K-13 in educational programs focused on science literacy and environmental stewardship, character development, community youth development and healthy lifestyles. 4-H educators and caring adult volunteers and teen volunteers share their skills to make a difference in the lives of the 45,957 youth who participate in the program.

Impact: The major programmatic focus for their participation has been in the areas of science literacy and environmental stewardship, character development, healthy lifestyles and children, youth and families at risk initiative.

In 2004, New Jersey 4-H youth were engaged in positive youth development which enabled them to acquire life skills necessary to meet the challenges of adolescence and adulthood in the following ways:

- 16,814 youth were members of 1,303 4-H organized clubs
- 7,408 youth were members of 768 4-H special interest/short-term programs
- 2,110 youth participated in 170 camping programs
- 27,624 youth were involved in 11,163 4-H school enrichment programs
- 19 youth participated in 4-H individual study programs
- 478 youth participated in 20 SACC education programs
- 0 youth participated in instructional video/TV

Volunteers are the backbone of the 4-H program. In 2004, 2,221 adult leaders and 290 teens successfully delivered the program. The average adult volunteer donates 220 hours per year. This volunteer investment of time and efforts translates to over \$11 million dollars in return. 4-H educators work collaboratively with other youth serving agencies and organizations to extend the outreach of 4-H to a population of more diverse and underserved youth, while at the same time increasing resources available to 4-H. The youth of New Jersey are engaged in meaningful experiences and are gaining invaluable skills which will benefit society in the future.

Source of Federal Funds: Smith Lever 3(b) & (c)

Scope of Impact: State Specific

Goal 5

Key Theme: Children, Youth and Families at Risk
Jobs/Employment
Workforce Preparation

Activity: Children in America who have no option for positive activities during non-school hours report that they have engaged in 2 or more high-risk behavior, such as alcohol use, crime and school failure. Research has shown that active engagement of youth in decision making enhances their development of life skills.

“SJTC YOUnited”: Youth/Adult Partnerships (South Jersey 4-H Teen Conference) engage youth and adults as equal partners in program planning and implementation to expand involvement of youth in 4-H program efforts. Youth and their adult partners were provided with several opportunities to develop strategies to overcome the challenges of youth/adult partnerships. Teen Council members from 10 southern counties along with the State 4-H Teen Advisory Council developed the overall program. The conference consisted of three interactive workshops, “Youth and Adults Understanding Each Other”, “Youth and Adults Working Together”, and “Developing County Action Plans”. 162 Youth and 26 adult advisors participated in the regional weekend conference.

Impact: The major indicator of success was the progress made on the development of action plans to implement at home as documented by an eight-month follow up report. One county’s success was the total re-vamping of the ‘adult leaders’ association to become a 4-H Program Advisory Council including both youth and adult representation. Two counties now include youth representatives on their county horse advisory councils. Three counties worked with their fair committees, resulting in youth representation on the fair planning groups. Increased adult involvement on the teen council was the result in two counties. Two counties worked to strengthen youth/adult partnerships in county event planning and in initiating new communication methods (websites). Research results have shown that youth involvement and positive activities and on-going relationships with caring adults help youth become capable and successful adults.

Overall post conference evaluations indicated that 100% found that the experience met or exceeded their expectations. This conference resulted in organization culture and structure changes which embrace the value of youth/adult partnership as a core value for youth development.

Sources of Federal Funds: Smith-Lever (b) & (c)

Scope of Impact: State Specific

Goal 5

Key Theme: Character/Ethics Education
Conflict Management
Youth Development/4-H

Activity: In 1990 the U.S. Secretary of Labor organized the Secretary's Commission on Achieving Necessary Skills (SCANS). The SCANS Report for America 2000 identified the knowledge, skills, and attitudes that youth must have in order to complete successfully in the workplace. A high percent of New Jersey youth are classified as at-risk based on the number who live below the poverty level, high school dropout and suspension/expulsion rate, juvenile arrest rate, and lack of job preparedness. Additionally, it has been recognized that as many as 20% of youth-at-risk have mental and emotional disorders that further complicate their chance for success. The cost for institutionalization is extraordinarily high. For mentally ill youth it can cost \$45,000 to \$100,000 per year. Not dissimilarly, it cost about \$50,000 per year to incarcerate a youth or adult. If there is positive intervention to reduce these trends the benefits are immeasurable socially and could result in a tremendous savings in tax dollars.

Rutgers Cooperative Research & Extension faculty and staff have developed and implemented innovation programs to engage at-risk-youth in positive life altering educational experiences many providing them with workforce development skills.

In Bergen County the "First Jobs in the Green Industry" program partners with the Bergen Department of Mental Health and the Bergen Vocational Technical School targeting at-risk and mentally ill youth. In its sixth year this program focuses on a wide range of horticultural projects, resume preparation and job interview readiness.

Youth enrolled in the NJ Youth Corps gain vocational and experiential training to develop job skills, better personal decision-making, and increased employability through the three day "Green Industry Vocational Training for At-Risk Youth in NJ". Youth participate in arbor the Brownfields Technician Training program concurrently learning to enhance, maintain and preserve our states tree resources. In Atlantic County the "Taking Charge" prevention program focuses on personal development and life skills pro-social peer relations, school attachment, and healthy lifestyles. The target audience is first-time low level juvenile offenders referred through the courts. Youth meet twice weekly to complete 16 lessons focused on life skills development while at the same time developing the sense of empowerment to attain goals. The Roots of Knowledge Project" provides youth and adults from at-risk communities opportunities to: 1) become responsible partners in personal and community development, 2) improve communication/conflict resolution skills, 3) acquire skills to produce fruits and vegetables, and adopt healthy lifestyles by reducing high-risk behaviors and taking responsibilities for health decisions, 4) expand life skills including career exploration, workforce readiness, and volunteerism. This project uses horticulture and gardening as the tool to cultivate youth and communities.

The Rutgers Cooperative Research & Extension Youth Farmstand Programs is a statewide interdisciplinary program designed to increase workforce readiness skills in at-risk youth, support local farmers and build healthier stronger communities. The farm stands use an entrepreneurial approach in which youth gain experience in the mechanics of owning and operating small business. Youth Farmstands currently operate in Mercer, Monmouth, Gloucester and Atlantic Counties primarily in economically disadvantaged areas.

Impact: The “First Jobs in the Green Industry” program which targets mentally ill youth with horticultural therapy reports that 80% of participants stay out of placement resulting in significant dollar savings which would have been spent for institutionalization. One student credits the program with helping to boost his confidence resulting in admittance into Rutgers – Livingston College verifying the fact that success with plant can lead to successes in other aspects of life.

Evaluation results from the NJ Youth Corps program indicate that 95% stated they would share their new knowledge and highly recommend the training for future classes. Youth gained marked knowledge/skills in pruning, climbing, techniques, and work zone and chain saw safety with a 85% increase in the proper use of climbing spurs, and 89% increase in proper pruning techniques. Of the 32 referrals to the “Taking Charge” prevention program 24 successfully completed the program. 100% have remained in school (92%) and (8%) are completing their GED in a certified program. 100% have not re-offended after 3 and 6 month follow ups. 63.5% increased anger management/conflict resolution skills. 48% of parents indicate they improved skills in setting rules, explaining rules and consequences and how to follow through with enforcement.

Participants in the “Roots of Knowledge Project” reported the following: 98% learned more about their own personalities and skills. 95% understood the key concepts that should be included in a resume, 89% were able to identify all effective interviewing skills on a job interview quiz. 80% wrote resumes and presented them to potential employers a Horticultural Job Fair. Two participants gained employment as a result of their participation.

Youth Farmstand Project participants demonstrated increased workforce readiness skills and attitudes at the close of the selling season. More than \$50,000 in combined wages were earned by the 72 at risk youth who participated in the program.

Source of Federal Funds: Smith Lever 3(b) & (c)

Scope of Impact: State Specific

Goal 5

Key Theme: Children Youth and Families at Risk
Youth Development/4-H

Activity: Education data indicates that our at-risk communities have a significant rate of high school dropouts and poor attendance – Atlantic City had a 10.5% drop out rate, and Pleasantville had an 7.4% rate (the state average is 3.8%). While Atlantic County has improved its ranking for juvenile arrests, it still ranks 13th out of 21 counties and the juvenile commitment rate shares 7.1% of the state average, ranking 15th. In Atlantic County, an estimated 15.4% of our children (1998 Kids Count, New Jersey) live below the poverty level and has experienced a 40% increase in juvenile assaults and misdemeanors.

The summer campers were part of the Uptown Complex Family Center's Peacemakers Summer Day Camp Program. The participants were from the high at-risk communities of Atlantic City and Pleasantville and ranged from grade 1 to grade 8. The objectives of the overall program were to provide youth enrolled in the Peacemakers Summer Day Camp Program with:

- a. hands-on gardening and plant science activities
- b. food preparation and nutrition education of common garden vegetables and herbs
- c. an opportunity to exhibit projects in annual 4-H Fair

As an action oriented summer program, all activities were hands-on with processing time during snack time at the close of each of the weekly sessions. Each session was 2 hours in length, with 6 separate sessions held throughout the program.

Seventy-two youth enrolled in the Uptown Complex Family Center's Peacemakers Summer Day Camp participated in 6 weeks of gardening/plant science and food and nutrition activities. A variety of vegetable, herb, and flower seedlings were planted in 3 raised beds. Participants learned how to prepare a garden site, plant seedlings, and care for plants throughout the 6 weeks. The youth also learned about garden products and their uses through activities such as making blueberry milkshakes, ice cream in a bag, and pasta salad using fresh grown tomatoes, peppers, and basil. The participants also made nature crafts that they exhibited at the annual Atlantic County 4-H Fair.

Impact: All participants rated the overall program as great or good. Evaluations indicated that the majority of participants learned how to work together on group games and experiences, how to use food from the garden in favorite recipes, and skills in planting and caring for plants from seedlings to harvest.

All participants were observed to participate fully and enthusiastically in all activities and many parents began to pick up their own children at Cityscape as the weeks progressed initially because of the excitement their children had been expressing and then to note the garden growing each week.

The director of the Family Center, stated families have already requested to have their child put on a waiting list for the next gardening program available at Cityscape.

Sources of Federal Funds: Smith-Lever (b) & (c)

Scope of Impact: State Specific

B. Stakeholder Input Process

As reported in previous years, Cook College and the New Jersey Agricultural Experiment Station (NJAES) engaged stakeholders in a strategic planning process. As we move forward with the implementation of the strategic plan, stakeholders continued to be actively engaged. The Cook College/NJAES leadership team engaged stakeholders in sessions throughout the state sharing the vision for the future.

Annual county budget sessions were conducted in conjunction with stakeholder input meetings in counties throughout the state engaging a diverse cross section of residents, organizations, and collaborative partners encouraging their input into the budget, program planning, and development process for Cooperative Extension. In addition, Rutgers Cooperative Research & Extension actively engages stakeholders throughout the year through service on Extension advisory boards. Extension faculty and staff also work collaboratively with community leaders and agency and organization representatives to ensure that the diverse needs of county residents are addressed through appropriate Extension educational programs.

The state mandated NJAES Board of Managers is an advisory group appointed by the Rutgers University Board of Governors based on nomination by each county Board of Agriculture as well as representatives from six other major constituencies related to the Cook/NJAES mission: environment, biotechnology, marine science, food science community resources and public policy. The Board of Managers has research, extension and teaching committees that provide valuable input directly to respective deans, faculty and staff relative to defining initiatives, identifying resources, establishing linkages and proactively addressing critical issues essential to the successful development of NJAES/Cook College programs.

Faculty members at Cook College and the NJAES are eligible to apply for competitive funding for the McIntire-Stennis program. It is expected that these proposals will meet the goals of the McIntire-Stennis Cooperative Research Act of 1962, as well as abide by the mission of the NJAES. Proposals for McIntire-Stennis funding are evaluated by two separate reviewer groups to ensure selection of only those proposals which will provide the most impact to the field of forestry and that will result in the most benefit to the relevant stakeholder groups. These two groups are the Environmental and Natural Resources Council and the Forestry Advisory Council. To this end, proposals are evaluated by the Forestry Advisory Council, whose members consist of industry, government and faculty leaders in forestry, reviews and evaluates the proposals. Also, they are reviewed by the Environmental and Natural Resources council, a group of faculty and staff dedicated to identifying and promoting the best scientific and outreach programs in NJAES and Cook College.

NJAES/Cook College has various constituents and industry advisory boards to academic departments and centers. These advisory groups meet between one and four times a year, depending on the department or center. They provide valuable technical input and links with constituents.

C. Program Review Process

There have been no significant changes in the merit review or scientific peer review processes since the inception of the Plan of Work. Plans are underway to more actively engage the Research Committee of the NJAES Board of Managers in the merit review process.

D. Evaluation of the Success of Multi and Joint Activities

At Rutgers our process for the generation and transfer of knowledge and technologies is best viewed as a continuum in an integrated system. This dynamic research, education and outreach system anticipates and responds to issues and challenges in agriculture, food systems, environment and natural resources, and human and community health and development in order to empower people to improve their lives, the lives of others, and the environment on which they depend. Needs assessments occur at the grassroots level, through industry organizations, advisory boards, professional associations and the student body to identify critical issues of strategic importance. Multistate, multi-institutional, and multidisciplinary activities and joint research and extension activities have been implemented to address these identified issues that are representative of the concerns of the diverse population of our state including agricultural, environmental, industry, youth, underserved, underrepresented, at-risk, urban and geographically isolated residents. Planned programs also address identified critical issues within the region where formal memoranda of understanding and collaboration agreements have been developed between states. The resulting agreements have resulted in both improved program effectiveness and efficiencies as documented in the reports of the Extension multistate and integrated research and extension activities, states involved in these joint efforts have benefited greatly from the shared faculty, researchers and extension specialists who have addressed critical programmatic needs that expand beyond the state.

E. MULTISTATE EXTENSION ACTIVITIES

Penn Jersey Livestock/Crops Program

Agents from Pennsylvania and New Jersey on the northern borders of the Delaware River planned and conducted the Northeast Regional Small Farm and Rural Living Expo and Trade Show. The expo was geared to small farm operations which provide a significant impact on the economics, aesthetics and rural character of communities in the Northeast. During this two day event, over eighty workshops and demonstrations were presented to assist new farmers, farm managers and rural residents to make strategic linkages with support agencies, supplies and sound research based information. This event provided participants the opportunity to develop skills to assist in the management and marketing of their agricultural endeavors. Over 2,600 participants attended the event from nine states.

The Penn Jersey Extension Partnership delivered for the third year a Regional Crop Master Program for area crop producers. The two day intensive training session featured “weed management” as a focus for over thirty producers. The series improved grower concepts for weed identification, treatment, and control using cultural and chemical practices. The three year “Crop Master” Series was recognized at the 2001 National Association of County Agricultural Agents meeting as the award winning entry in the Search for Excellence in Crop Production. The entry won the Northeast division and then was one of four national finalists and was selected as the national winning entry.

Coinciding with the Crop Masters Series, the Penn Jersey Extension Partnership designed and developed a user friendly crop web page entitled www.cropmaster-icm.org. The website to date has had over 50,000 hits and has received wide acceptance from growers and other colleagues. Penn State University has linked the website for their forage informational website. Additionally, the fact sheets developed for the web page, were awarded the northeast team fact sheet award for the 2001 NACAA entries. Weekly Crop Alerts/Reports are also hosted on the web page and feature current topics and happenings as reported by agents, specialists, farmers, and crop agencies.

Due to staffing changes, the Penn Jersey Livestock/Crops Program was disbanded as an official Multistate Extension Activity during FY03.

In 2004, The Penn Jersey collaborative programming resumed with educational programs on equine forage needs and forage quality. A series of twenty-two educational programs were offered. In addition a survey of 1200 horse owners documented hay buying practices and prices.

Mid-Atlantic Consortium (MAC), Pathways to a Better Trained Workforce

This regional project in NJ, NY, MD and DE continues its focus on systemic change in the educational systems of the region building extensive public and private partnerships, documenting multiple pathways which enable youth to enter productive careers in the food industry. Two of the five demonstration programs were developed in Burlington County, NJ. These are the Supermarket Experience, which is a fifth grade curriculum delivered by Junior Achievement of South Jersey and the Factory Floor Classroom which is a course on food processing offered on site at Ocean Spray Incorporated.

MAC – Food Policy Institute

The Food Policy Institute (FPI) is a unique partnership created to focus on policy issues and challenges facing the food industry and food consumers in the mid-Atlantic region. The Institute's mission is to develop timely and relevant research programs that address pressing food policy issues and to engage in outreach and education to industry, consumers, and policy makers. The objective is to maximize the quality of decision-making for industry executives and government regarding food production, distribution, quality, consumption and the nutritional and health implications.

Higher education partners participating in this regional program include: Rutgers University, Cornell University, University of Delaware, Delaware State University, Sussex County College, Mercer County College, University of Maryland – College Park, and University of Maryland – Eastern Shore. In addition, there are numerous industry and trade associations, government agencies, and other public entities participating in FPI.

The FPI's supports research and outreach projects relating to the following food policy issues: 1) Consumer perceptions of food biotechnology, 2) Usage of alternative food delivery systems, 3) Nutraceutical industry development, 4) Blueberry industry development, 5) Food waste diversion, 6) receiving numerous grants including a "Consumer Acceptance of Food Biotechnology in the US" funded by USDA's IFAFS program and 7) BSE consumer survey.

MAC – Food Systems Web

The Mid-Atlantic Food Systems Web Site Project launched its initial product in March 2001 as “agriculturehealth.com”. It is a comprehensive, interactive source providing information to farmers on how to direct market product to consumers, to consumers looking for nutrition information relating to the health benefits of local fresh produce, general information on food safety and the interaction of agriculture and the environment, specifically in the area of watershed management. Consumers and farmers are aided in finding each other by a local produce directory system that allows farmers to list their farms and products, and consumers to search for farms by area and product.

Mid-Atlantic Fruit, Vegetable, Crop Manuals and Conferences

In FY 2002 New Jersey Extension specialists and agents again worked with colleagues in one or more of the neighboring states (PA, DE, MD, WV, VA) to produce “Commercial Vegetable Production Recommendations for New Jersey”, “Tree Fruit Production Guide for New Jersey” and “Pest Management Recommendations for Field Crops”. These are the leading handbooks for commercial agricultural producers and even small part time farmers in these states. More than 3500 copies are sold each year. Recommended practices address economics, environment (IPM) and practical tools for everyday agricultural activities. The use of the recommendations enables growers to maintain their competitive efficiency and helps them to minimize pesticide use and adhere to pesticide use regulations.

In FY 02 the 32nd Annual Mid-Atlantic Vegetable Workers Conference was held. At this conference results from numerous field experiments were presented to share performance of the latest pest control measures, varieties, cultural practices and marketing strategies. In FY 2002 the multistate team also gave leadership to the Mid-Atlantic Crop Management School and Mid-Atlantic Pumpkin School.

Research at Rutgers Agricultural Research and Extension Center conducted in vegetable weed control in the early 1990’s resulted in the first reports of safety in cucurbit crops treated with halosulfuron. Continued work to date has contributed significantly to the labels obtained in 2001 and 2002. The control of these tough weeds, especially yellow nutsedge, is perhaps the most significant contribution to vegetable production in the past decade. Continued research is under way to extend the label to watermelons and between the rows of summer squash grown on plastic mulch.

NJ/Delaware Weed Science Cooperative Agreement

New Jersey and Delaware work collaboratively to share specialist expertise in weed control. Delaware provides field and forage crop weed management expertise and New Jersey nursery/turf expertise to Delaware. In FY 2001, soybean herbicide demonstration plots were established in NJ. The plots were used to educate over 60 growers at an Extension twilight meeting about newly developed herbicide resistant soybeans and weed control management strategies. Specialists continued to deliver a strong multistate outreach program to a diverse clientele in weed management in turfgrass and ornamentals. The information was also presented at field crop growers meeting. Presentations in the form of seminars and workshops to commercials and public clientele (landscape contractors, golf course superintendents, parks and recreation) on integrated weed management in turfgrass and ornamentals were conducted in Delaware. There is also year round interaction with the Delaware Cooperative Extension in the form of published fact sheets, email and phone calls.

Northeast and Mid-Atlantic Direct Marketing

This collaborative effort with states throughout the region (NJ, NY, PA, MD, VA) and direct marketing organizations is co-coordinated by New Jersey. The major event is an annual conference in which educational programs and exhibits are a major component. The FY01 conference was held in Virginia. The 3 day conference attracted 325 attendees.

Farmer to consumer marketing continues to be a major issue in the region. Farmers are looking for state-of-the-art resources during a time of declining resources devoted to marketing. Agri-culturehealth.org a web-based multi-institutional collaborative educational system interlinking direct marketing resources, food systems and health was launched. This tool links consumers looking for fresh local product to the farmers that produce them.

This year's Mid-Atlantic (Farmer's) Direct Marketing Conference & Trade Show attracted 350 farmers and direct marketers.

4-H Juried Curriculum and Related Educational Product Development

The National 4-H Experimental Learning Design Team oversees the efforts of the 4-H juried curriculum. The affiliate Extension Specialist in Educational Design serves on this national team and provides guidance to youth curriculum for the state. Guidance is provided for the development of all youth curriculum to ensure that they conform to the 4-H experimental learning criteria and standards. Over 50% of the materials used to support the New Jersey 4-H Youth Development program are national juried pieces. In addition to serving on the jury the NJ specialist is a member of the Experimental Learning Design Team which coordinates experimental learning curriculum development and other supporting activities.

The Somerset County 4-H Agent serves the liaison to NASA Education and Public Outreach Forum. In this role she assisted in the development of national educational materials for youth.

Regional Research Projects

As a part of regional projects NE-183 and NC-140 a New Jersey County Ag Agent contributes to the demonstration and outreach of results from apple, semi-dwarf apple, apricot, sweet cherry, varieties and rootstock trials. This is done through several field days to various clientele each year and via websites. This team continues to make significant progress in meeting the needs of apple growers.

Cumulative state and federal investment in NC-140 for the last 5 years was approximately \$5 million. Cumulative, measurable benefits to the US temperate tree-fruit industries were more than \$300 million. Less easily measured benefits, such as averted losses and enhanced environmental quality, certainly increase the financial value of NC-140 to well beyond \$300 million in the last 5 years.

NC-140 output guided propagation of fruit trees in nurseries, allowing them to tailor better their output to grower demands and to avoid problematic rootstocks. As an example, a series of cherry rootstocks from Russia were gaining a great deal of interest, but NC-140 work found them to be hypersensitive to Prunus Necrotic Ringspot virus, reducing their suitability for U.S. production.

NC-140 continues to develop advanced experimental design approaches to reduce the costs of rootstock research.

**U.S. Department of Agriculture
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 (Attach Brief Summaries)**

Institution Rutgers University
State New Jersey

Check one: **Multistate Extension Activities**
 Integrated Activities (Hatch Act Funds)
 Integrated Activities (Smith-Lever Act Funds)

Actual Expenditures

Title of Planned Program/Activity	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
PENN-JERSEY Livestock/Crops	4,000	4,000	17,770	-	15,222
MAC-PATHWAYS/Food Policy & Food Systems Web	21,500	25,000	27,448	18,450	9,281
Mid-Atlantic Fruit, Veg., Crop Manuals/Conference	4,000	4,000	7,511	5,300	9,180
Weed Science – NJ/Delaware	2,500	2,500	2,912	2,980	6,976
Northeast Direct Marketing	1,000	1,000	752	780	5,774
EPA-2/Cornell & Rutgers	13,000	13,000	8,000	-	-
4-H Jury Curriculum & Related	1,000	1,000	1,166	1,475	5,541
Regional Research Projects	1,423	1,500	1,850	2,140	4,041
Other	-	-	-	-	-
Total	48,423	52,000	67,409	31,125	56,015

Karyn Malinowski
 Director of Extension

April 1, 2005
 Date

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F. Integrated Research and Extension Activities

Animal Production Efficiency

Integrated projects are focused on increasing the reproductive efficiency of sheep and goats, as well as elucidating the roles of steroid hormones in female sexual behavior. Studies with female goats provide a strong comparative model for human post-menopausal women. In addition, NJAES reported on projects investigating strategies for maintaining and improving immune function in exercising aged horses, and preventing insulin/glucose-related metabolic diseases of younger horses. The latter project has resulted in a patented test of a low dose oral dextrose challenge as a reliable test of glucose metabolism in young horses.

Field and Forage Crops

A proactive campaign is being developed to increase the awareness of new federal regulations relating to nutrient management. Our faculty investigated the use of animal manure on crops and reported an improvement in soil fertility, tilth, organic matter and increase water holding capacity while reducing the need for chemical fertilizers. A team continues its efforts in identifying species that persist and provide stable yield production across growing environments and seasons with reduced herbicide inputs. New soil and analysis test methods developed for vegetable crops enables farmers to better adjust nitrogen fertilizer needs to the crop. The co-application of manganese fertilizer and herbicides saves time and money. Suppressing plant diseases with nutrients such as manganese or silicon reduces the need for pesticides. Cooperative Extension has been successful in equine pasture management educational efforts related to soil fertility and soil testing.

Turfgrass Breeding and Management

Our team of turfgrass specialists including breeding, biotechnology, management, pathology, entomology, and weed control science continue to make progress on developing new varieties and establishing best management practices for the production and maintenance of turfgrass, and the reduction of pesticides and fungicides. The objective is to explore and develop turfgrass that exhibit qualities that make them resistant to damage by weed control chemicals, foot traffic and mowing. This will be accomplished through the use of best management practices such as utilizing germplasm with improved traffic stress and disease resistance, implementing sound cultural practices, and initiating fungicide application strategies based on IPM scouting techniques rather than calendar-based sprays. The effectiveness of nematodes against white grubs continues to be demonstrated, and has proven effective for long term control, thereby dramatically reducing the need for grub insecticides. Continuing work on the heat tolerance of bentgrass species aid in establishing management practices for heat tolerant species. Results from this research help golf course superintendents make informed choices when selecting new bentgrass cultivars and improve their ability to manage these cultivars once they are established. Researchers determined that fungal endophytes are important in turfgrass due to the insect tolerance conferred by alkaloids produced by the fungi. The development of perennial ryegrass cultivars with resistance to gray leaf spot should greatly improve the usage of this species and reduce fungicide applications. Approximately 200 turfgrass varieties from this program are

currently licensed to and are being marketed by commercial seed companies. These specialists continue to participate in a multi-state effort to develop best management practices for turf systems in the eastern US.

Plant Pest Management

There are a number of projects focused on integrated pest management for economically important plants, including fruit trees. Rapid responses to the emergent problem of Late Blight Infection provided growers the ability to prevent, detect and treat this serious disease. An ongoing surveillance program has been developed in cooperation with the NJ Department of Agriculture and educational programs have been developed to increase awareness of NJ growers. Other projects investigate ways to combat sooty blotch, powdery mildew and other diseases in apples, as well as evaluating disease resistant potato cultivars.

Plant Production Systems

Several multistate efforts are actively researching the problems facing the landscape (environmental) plant industry. The nationwide membership of this research group provides an excellent means for researchers in states with similar production, marketing, or management problems to cooperate as a team. Research and outreach efforts have been conducted in support of the New Jersey greenhouse industry, especially related to design, construction, and operation of controlled environment plant production facilities. The knowledge gained from designing and operating an entirely closed plant production system, as needed for NASA's long duration space missions, can be directly applied to the commercial greenhouse industry. The NJ program supports the NJ commercial greenhouse industry and continues to contribute to a NASA funded NSCORT project to develop closed plant production systems for advanced life support research program. Research focusing on the efficiency of greenhouses reported improved production using reduced amounts of heat and improved ventilation, especially important for cool and cloudy climates. The research and outreach efforts that have been conducted in support of the New Jersey greenhouse industry, especially related to design, construction, and operation of controlled environment plant production facilities have received special recognition.

Food Safety

A food science specialist has developed a good agricultural practice training program to improve the safety of produce grown in NJ. In partnership with the NJ Department of Labor, a training program has been developed to teach food safety, good manufacturing practices and HACCP to food companies. Focusing on the high cost of foodborne diseases, a study of the obstacles to adopting safe food habits, including food safety knowledge and factors affecting attitudes and behaviors can help food safety educators better understanding of why people engage in risky behaviors and improve food safety education interventions. Research on compounds that inhibit foodborne disease causing organisms provided information on how nisin and pleurocidin can significantly decrease the activity of a wide spectrum of these foodborne disease agents. Another project provides information via workshops, seminars and computer programs for processors and retail operators in the safe cooling of food products using mathematical models and predictive modeling.

Nutrient Management and Recycling

Research and extension teams are working on developing methods and management practices for economically and ecologically sound use of nutrients for agriculture. Projects include the investigating, the effect of land application of municipal collected shade tree leave on soil quality and crop production, and the environmental and economic impacts of nutrient management on dairy forage systems (as a contribution to a multi-state research project), and demonstrated that better monitoring and management of animal diets leads to less nutrient excretion and greater profitability. An additional research and education program focuses on diverting food wastes to animal feed instead of landfilling or incinerating. Recently, this program has resulted in the publishing of a handbook, numerous scientific and popular articles, national symposia, numerous invited presentations, and the creation of the Food Recovery and Recycling Association of North America. Partnerships between agents and specialists reported that for sewage biosolids, there are plant-available nutrients and organic matter useful in improving soil structure, recycling these materials through land application is increasingly being viewed as desirable. Best management practices for non-traditional organic wastes provide agricultural extension agents, the Natural Resources Conservation Service, and farmers with the information they need to effectively use non-traditional wastes without contributing to non-point source pollution.

Agricultural Financial Management

This is multifaceted program with the New Jersey Farm Management Program as its centerpiece. The latter program funded through a multi-year grant from the NJ Department of Agriculture provided formal training to over 4000 producers in the areas of management, marketing, finance and investment. Another component of this overall program is participation in Northeast Farm Management Working Group focusing on risk management. As part of a Northeast Sustainable Agriculture Research and Extension project, 80 budgets were developed for conventional, IPM and organic production systems. A series of budgets for conventional, ICM, and organic production methods were made available on line for crop and livestock budgets in New Jersey. Related activities include participation in two additional multi-state research projects focusing on the marketing and production of (1) fruits and vegetables and (2) environmental plants. The Risk Management Education Grant funded two hands-on workshops targeted at greenhouse owners. Greenhouse Cost Accounting software program allows greenhouse managers to allocate costs to specific crops. It enables users to easily determine profitability of specific greenhouse crops and explore full cost accounting.

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Check one: Multistate Extension Activities
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Actual Expenditures

Title of Planned Program/Activity	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
<u>Animal Production Efficiency</u>	<u>39,755</u>	<u>20,858</u>	<u>52,228</u>	<u>49,863</u>	<u>54,320</u>
<u>Field and Forage Crops</u>	<u>35,821</u>	<u>17,465</u>	<u>35,173</u>	<u>-</u>	<u>-</u>
<u>Turfgrass Breeding and Management</u>	<u>54,413</u>	<u>73,470</u>	<u>58,809</u>	<u>45,827</u>	<u>57,888</u>
<u>Plant Pest Management</u>	<u>32,588</u>	<u>-</u>	<u>-</u>	<u>40,714</u>	<u>25,829</u>
<u>Plant Production Systems</u>	<u>42,578</u>	<u>126,517</u>	<u>127,809</u>	<u>92,261</u>	<u>97,563</u>
<u>Food Safety</u>	<u>16,425</u>	<u>8,354</u>	<u>9,577</u>	<u>73</u>	<u>9,682</u>
<u>Food Security</u>	<u>19,941</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
<u>Human Nutrition</u>	<u>8,732</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>23,525</u>
<u>Nutrient Management/Recycling</u>	<u>23,365</u>	<u>33,365</u>	<u>39,078</u>	<u>40,085</u>	<u>13,783</u>
<u>Agricultural Financial Management</u>	<u>16,491</u>	<u>17,440</u>	<u>9,650</u>	<u>24,125</u>	<u>46,067</u>
Total	<u>294,109</u>	<u>297,469</u>	<u>332,324</u>	<u>292,948</u>	<u>328,837</u>

Keith Cooper, Ph.D
 Dean of Research

April 1, 2005
 Date

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Actual Expenditures

Title of Planned Program/Activity	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
<u>Field and Forage Crops Management</u>	<u>7,880</u>	<u>9,556</u>	<u>-</u>	<u>-</u>	<u>-</u>
<u>Turfgrass Breeding and Management</u>	<u>37,293</u>	<u>60,516</u>	<u>96,598</u>	<u>88,617</u>	<u>92,505</u>
<u>Plant Pest Management</u>	<u>13,122</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
<u>Plant Production Systems</u>	<u>58,715</u>	<u>81,937</u>	<u>47,066</u>	<u>45,990</u>	<u>27,961</u>
<u>Food Safety</u>	<u>11,666</u>	<u>-</u>	<u>9,415</u>	<u>9,806</u>	<u>9,758</u>
<u>Environmental Quality (now part of Nutr. Mgt/Recycling)</u>	<u>19,997</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
<u>Nutrient Management/Recycling</u>	<u>13,087</u>	<u>13,246</u>	<u>23,000</u>	<u>23,627</u>	<u>48,264</u>
<u>Agricultural Financial Management</u>	<u>7,720</u>	<u>8,895</u>	<u>9,030</u>	<u>12,944</u>	<u>9,612</u>
<u>Animal Production Efficiency</u>	<u>-</u>	<u>4,990</u>	<u>-</u>	<u>-</u>	<u>-</u>
Total	<u>169,480</u>	<u>179,140</u>	<u>185,109</u>	<u>180,984</u>	<u>188,100</u>

Karyn Malinowski
 Director of Extension

April 1, 2005
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